Appl. No. 09/891,677
Amdt. sent September 15, 2005
Reply to Office Action of April 21, 2005

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1.   (Currently amended): A method for changing a ~~scanning period~~frame frequency used in a liquid crystal display, comprising:

storing information into a controller of said liquid crystal display that is sent from a device external to said controller, said information comprising a first number of original clock periods in a reference clock period and a second number of said reference clock periods in a scanning period;

determining a reference clock period from ~~a~~ said first number of original clock periods;

determining ~~said~~ a scanning period from ~~a~~ said second number of said reference clock periods; ~~and~~

determining a frame period from said scanning period; and

changing said frame frequency based on said frame period ~~scanning period by at least one reference clock period~~.

2.   (Currently amended): A liquid crystal display controller for changing a ~~scanning period~~frame frequency used in a liquid crystal display, comprising:

a reference clock generator for generating a reference clock period from a first number of original clock periods in said reference clock period;

a timing generator coupled to said reference clock generator for generating a line pulse synchronized with a scanning period, said scanning period ~~having~~ being determined from a second number of said reference clock periods in said scanning period, and for generating a frame pulse that is synchronized with a frame period, said frame period having a plurality of scanning periods; and

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10   a control register having ~~a third number of~~ said first number of original clock

11   periods and said second number of said reference clock periods~~-~~, said first number and second

12   number being received from a device external to said liquid crystal display controller~~for~~

13   ~~changing said scanning period, wherein said third number is at least one original clock period~~

14   ~~different from said second number~~.

1   3.   (Currently amended): A liquid crystal display controller for displaying a

2   desired image on a liquid crystal panel comprising a plurality of scan lines, the liquid crystal

3   display controller comprising:

4   a control register for storing operating parameters received from a device external

5   to said liquid crystal display controller, said operating parameters comprising a first number of

6   reference clock periods in a scanning period, ~~and~~ a second number of scan lines in a frame

7   period, and a third number of original clock periods in said reference clock period;

8   a reference clock generator for generating reference clocks for a timing generator

9   based on said third number of original clock periods;

10   said timing generator for generating line pulses synchronized with one scanning

11   period and frame pulses synchronized with one frame period based on said first number and on

12   said second number.

1   4.   (Original): The liquid crystal display controller of 3 wherein said

2   operating parameters further comprise a division ratio and wherein said reference clock from

3   said reference generator is generated from an original clock using said division ratio.

1   5.   (Original): The liquid crystal display controller of 4 wherein said division

2   ratio is one.

        6 -35. (Canceled)

1   36.   (~~Previously presented~~Currently amended): A device for controlling a

2   display panel, the device comprising:

3   a first circuit for setting parameters for the display panel based on information

4   received from an external device, said parameters including a division ratio of an original clock

5   signal and a number of clock of a reference clock signal per a scanning period;

6   a second circuit for generating a clock signal based on the parameters; and

7   a third circuit for driving the display panel according to the clock signal,

8   wherein a frame frequency to drive said display panel changes when said

9   parameters are changed by said external device.

1   37.   (Currently amended): A display control device for providing an adjustable

2   ~~scan~~ frame frequency to a display panel, the display control device comprising:

3   a first circuit for setting a division ratio of an original clock signal and number of

4   clock of a reference clock signal per a scanning period based on information from an external

5   device;

6   a second circuit for dividing a frequency of the original clock signal by the

7   division ratio to ~~determine a frame frequency~~ generate said reference clock signal based thereon

8   and for generating a signal having the frame frequency from said reference clock signal based on

9   said number of clock of said reference clock signal; and

10   a third circuit for converting data from the external device into a driving voltage

11   signal to be coupled to the display panel.

1   38.   (Currently amended): A device for controlling a display on a display

2   panel on which a plurality of data lines and a plurality of scanning lines are arranged in a matrix,

3   the device comprising:

4   a first generator for generating an original clock signal;

5   a memory for storing display data received from an ~~external~~ device external to

6   said device for controlling;

7   a register for setting a division ratio of the original clock signal and ~~the~~ number of

8   clock of a reference clock signal per a scanning period and a number of active lines of the

9   display panel, all of which being received from said external device;

10   a second generator for dividing the original clock signal by the division ratio to

11   generate the reference clock, to thereby generate a line pulse synchronized with ~~a~~ said scanning

12   period and a frame pulse synchronized with a frame period; and

13   a data line driver for reading out display data from the memory according to the

14   line pulse and the frame pulse, for converting the display data into a driving voltage to be

15   provided to the display panel.

1   39.   (~~Previously presented~~Currently amended): A device according to the 38

2   wherein the date line driver reads out the display data line by line from an address on the

3   memory according to the line pulse, the address corresponding to a top line of the display panel,

4   and repeats the readout of the display data by using the address corresponding to the top line of

5   the display panel according to the frame pulse.

1   40.   (Previously presented): A device of according to the 38, the device further

2   comprising a scanning line driver for outputting a selecting voltage and a non-selecting voltage

3   to the scanning lines on the display panel according to the line pulse and the frame pulse.

1   41.   (New): The device of according to claim 36, wherein the frame frequency

2   is determined from the division ratio of the original clock signal and the number of clock of the

3   reference clock signal per the scanning period.

1   42.   (New): The device of according to claim 36, wherein the parameters

2   further includes number of active lines of the display panel and the frame frequency is

3   determined from the division ratio of the original clock signal the number of clock of the

4   reference clock signal per the scanning period and the number of the active lines of the display

5   panel.

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1   43.   (New): The device of according to claim 36, wherein the number of clock

2   of the reference clock signal per the scanning period is an integer.

1   44.   (New): The device of according to claim 37, wherein the frame frequency

2   is determined from the division ratio of the original clock signal and the number of clock of the

3   reference clock signal per a scanning period.

1   45.   (New): The device of according to claim 44, wherein the frame frequency

2   is determined from the division ratio of the original clock signal the number of clock of the

3   reference clock signal per the scanning period and the number of the active lines of the display

4   panel.

1   46.   (New): The device of claim 37, wherein the first circuit sets number of

2   active lines of the display panel based. on information the external device and the second circuit

3   generates said signal having the frame frequency from the reference clock signal based on the

4   number of the active lines of the display panel.

1   47.   (New): A device of according to the claim 37, the device further

2   comprising a fourth driver for outputting a selecting voltage and a non-selecting voltage to the

3   scanning lines on the display panel according to the signal having the frame frequency.

1   48.   (New): A device of according to the claim 37, wherein the frame

2   frequency is adjustable by at least one of the division ratio of the original clock signal and the

3   number of clock of the reference clock signal per the scanning period to be set in the first circuit

4   from the external device.

1   49.   (New): A device of according to the claim 37, wherein the number of

2   clock of the reference clock signal per the scanning period is an integer.

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1   50.   (New): The device of according to claim 38, w herein the second

2   generator generates the line pulse and the frame pulse from the reference clock based on the

3   number of clock of the reference clock signal per the scanning period and the number of the

4   active lines of the display panel.

1   51.   (New): The device of according to claim 38, wherein a frame frequency

2   of the frame pulse is determined from the division ratio of the original clock signal the number of

3   clock of the reference clock signal per the scanning period and the number of the active lines of

4   the display panel.

1   52.   (New): A device of according to the claim 38, wherein the frame

2   frequency of the frame pulse is adjustable by at least one of the division ratio of the original

3   clock signal the number of clock of the reference clock signal per the scanning period and the

4   number of the active lines of the display panel to be set in the register from the external device.

1   53.   (New): A device of according to the claim 38, wherein the number of

2   clock of the reference clock signal per the scanning period is an integer.